

HERBIVOROUS INSECTS ASSOCIATED WITH THE PAPERBARK *MELALEUCA QUINQUENERVIA* AND ITS ALLIES: IV. TORTRICIDAE (LEPIDOPTERA)

J.K. BALCIUNAS^{1,4}, D.W. BURROWS² and M. HORAK³

¹ United States Department of Agriculture, Australian Biological Control Laboratory, Kevin Stark Research Building, James Cook University, Townsville, Qld, 4811

² Australian Centre for Tropical Freshwater Research, Australian Biological Control Laboratory, James Cook University, Townsville, Qld, 4811

³ CSIRO, Division of Entomology, G.P.O. Box 1700, Canberra, A.C.T. 2601

Abstract

We conducted surveys in northern and southeastern Queensland and in northern New South Wales to detect potential agents for the biological control of *Melaleuca quinquenervia* in Florida, USA, where it has become a serious pest. This paper presents records for 21 taxa of tortricid moths collected and reared on six *Melaleuca* species. Several of these Tortricidae may deserve further study as potential biocontrol agents for *M. quinquenervia*.

Introduction

Despite the diversity (around 250 species) and wide distribution of *Melaleuca* spp. (Barlow 1988), the herbivores associated with this genus are poorly known. The paperbark trees in the *Melaleuca leucadendra* (L.) L. complex (Blake 1968) are conspicuous and widespread along Australia's eastern and northern coastlines. Since its introduction as an ornamental in southern Florida, U.S.A. at the beginning of the century, *Melaleuca quinquenervia* (Cav.) S.T. Blake, a member of this complex, has become a serious pest. Since late 1986 we have regularly collected insect herbivores in Australia associated with *M. quinquenervia* and its close relatives in the *M. leucadendra* complex, in order to determine those that may have potential as biocontrol agents. We have presented records for 22 species of Noctuoidea (Balciunas *et al.* 1993a), 17 species of Geometridae (Balciunas *et al.* 1993b) and 31 species of Gelechioidea (Burrows *et al.* 1994) which we reared from *M. quinquenervia* and its close relatives. In this paper we present collection and rearing records for 21 taxa of Tortricidae. All are apparently new host records.

Methods

Nearly all the tortricids were collected as larvae, and reared on the tree species from which they were collected. Most were collected in quantitative samples (described in Balciunas *et al.* 1993a) from 1986-1993. These consisted of approximately 1 kg of plant material, collected in the field, then sorted in the laboratory. The remaining Tortricidae were collected directly from trees in the field or at our shadehouses. Adults were identified by one of the authors (M. Horak) as far as possible. Many tortricid genera are in need of revision and the generic classification of the Australian myrtaceous-feeding representatives of the tribe Eucosmini is totally inadequate. The names used in this paper are

⁴ Present Address: United States Department of Agriculture, Biological Control of Weeds Research Unit, Albany, California, U.S.A., 94710

Table 1. Toxicode species reared from Melaleuca glutinosa varia and eight other myrtaceous tree species.

Species	Collection site	Host	Stage and plant no.	Plant part fed	Collected upon	Collected	Life-history information
<i>Adoxophyes templauna</i> (Pagenstecher)	Cardwell Swamp	<i>Mil</i>	Larva 18.vii.86	Tip-binder	Adult emerged 3.xii.89	Adult emerged 3.xii.89	<i>Adoxophyes</i> sp. B
<i>Adoxophyes templauna</i> (Pagenstecher)	James Cook University	<i>Mjh</i>	Larva 20.vii.89	Tip-binder	Adult emerged 26.viii.91, pp=>8 d	Adult emerged 26.viii.91, pp=>8 d	<i>Adoxophyes</i> sp. C2
<i>Adoxophyes templauna</i> (Pagenstecher)	Howard River	<i>Mjh</i>	Larva 1.viii.91	Leaf-binder	Adult emerged 26.viii.91, pp=>8 d	Adult emerged 26.viii.91, pp=>8 d	<i>Adoxophyes</i> sp. C2
<i>Adoxophyes templauna</i> (Pagenstecher)	Frederick Beach West	<i>Mjh</i>	Larva 29.vii.92	Leaf-grazer	Adult emerged before 19.xi.92	Adult emerged before 19.xi.92	<i>Adoxophyes</i> sp. C2
<i>Adoxophyes templauna</i> (Pagenstecher)	Reedbank	<i>Mjh</i>	Larva 27.vii.87	Flowers	Adult emerged	Adult emerged	<i>Adoxophyes</i> sp. C2
<i>Adoxophyes templauna</i> (Pagenstecher)	Daintree Swamp	<i>Mgs</i>	Larva 17.vii.88	Flowers	Adult emerged	Adult emerged 30.vii.92	<i>Adoxophyes</i> sp. C2
<i>Adoxophyes templauna</i> (Pagenstecher)	Daintree Swamp	<i>Mjh</i>	Larva 8.vii.92	Leaf-binder	Adult emerged	Adult emerged 30.vii.92	<i>Adoxophyes</i> sp. C2
<i>Adoxophyes templauna</i> (Pagenstecher)	Daintree Industrial Park	<i>Mjh</i>	Larva 5.vii.93	Leaf-binder	Adult emerged 9.viii.93, pp=>8 d	Adult emerged 9.viii.93, pp=>8 d	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mgs</i>	Larva 17.vii.88	Flowers	Adult emerged	Adult emerged 30.vii.92	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 3.viii.87	Flowers	Adult emerged 10.viii.87	Adult emerged 10.viii.87	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 15.viii.87	Flowers	Adult emerged 6.x.87	Adult emerged 6.x.87	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 7.viii.89	Flowers	Adult emerged 16.viii.89	Adult emerged 16.viii.89	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 23.viii.93	Tip-binder	Adult emerged 16.xi.93	Adult emerged 16.xi.93	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 4.viii.93	Tip-binder	Adult emerged 3.xii.93	Adult emerged 3.xii.93	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 12.viii.93	Leaf-binder	Adult emerged 3.xii.93	Adult emerged 3.xii.93	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 20.viii.90	Leaf-binder	Adult emerged 27.viii.90	Adult emerged 27.viii.90	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 10.x.89	Tip-binder	Adult emerged 22.xi.89, pp=12 d	Adult emerged 22.xi.89, pp=12 d	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 28.xi.88	Tip-binder	Adult emerged 13.xii.88	Adult emerged 13.xii.88	<i>Adoxophyes</i> sp. C2
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 1992	Inside gall	Adult emerged	Adult emerged	<i>Adoxophyes</i> sp. C2
<i>Indooroopilly</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 4.viii.93	Leaf-binder	2 adults em. 26.xi.2.xii.93	2 adults em. 26.xi.2.xii.93	<i>Indooroopilly</i>
<i>Hubinger Road</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 2.larvae	Leaf-binder	Adult emerged 3.xii.93	Adult emerged 3.xii.93	<i>Hubinger Road</i>
<i>Forest Beach West</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 12.viii.93	Leaf-binder	Adult emerged 3.xii.93	Adult emerged 3.xii.93	<i>Forest Beach West</i>
<i>Flugas Site 1</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 23.viii.93	Tip-binder	Adult emerged 16.xi.93	Adult emerged 16.xi.93	<i>Flugas Site 1</i>
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 7.viii.89	Flowers	Adult emerged 16.viii.89	Adult emerged 16.viii.89	<i>Euabenamgee Swamp</i>
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 15.viii.87	Flowers	Adult emerged 10.viii.87	Adult emerged 10.viii.87	<i>Euabenamgee Swamp</i>
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 3.viii.87	Flowers	Adult emerged 6.x.87	Adult emerged 6.x.87	<i>Euabenamgee Swamp</i>
<i>Euabenamgee Swamp</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 7.viii.89	Flowers	Adult emerged 16.viii.89	Adult emerged 16.viii.89	<i>Euabenamgee Swamp</i>
<i>Hubinger Road</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 4.viii.93	Leaf-binder	Adult emerged 3.xii.93	Adult emerged 3.xii.93	<i>Hubinger Road</i>
<i>Indooroopilly</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 12.viii.93	Leaf-binder	2 adults em. 26.xi.2.xii.93	2 adults em. 26.xi.2.xii.93	<i>Indooroopilly</i>
<i>Tully Heads Road</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 9.xi.93	Tip-binder	Adult emerged 17.xii.93, pp=9 d	Adult emerged 17.xii.93, pp=9 d	<i>Tully Heads Road</i>
<i>Murriegal</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 9.xi.93	Leaf-binder	Adult emerged 23.xi.93	Adult emerged 23.xi.93	<i>Murriegal</i>
<i>Maclean</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 19.xi.90	Leaf-binder	Adult emerged 12.xii.90	Adult emerged 12.xii.90	<i>Maclean</i>
<i>Maclean</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 10.x.89	Tip-binder	Adult emerged 22.xi.89, pp=12 d	Adult emerged 22.xi.89, pp=12 d	<i>Maclean</i>
<i>Maclean</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 28.xi.88	Tip-binder	Adult emerged 13.xii.88	Adult emerged 13.xii.88	<i>Maclean</i>
<i>Tully Heads Road</i>	Bryton Bay Industrial Park	<i>Mjh</i>	Larva 9.xi.93	Tip-binder	Adult emerged 17.xii.93, pp=9 d	Adult emerged 17.xii.93, pp=9 d	<i>Tully Heads Road</i>

Table 1 (cont.). Tortricidae species reared from *Melaleuca quinquenervia* and eight other myrtaceous tree species.

Species	Collection site	Host	Stage and number	Date	Plant part	collected upon	Life history information
<i>Lobesia c. peltophora</i>	Oonoomba	Mqdn	2 larvae	19.vi.93	Flowers	2 adults emerged	
(cont.)	Willows Shopping Centre	Mqdn	2 larvae	17.vi.92	Flowers	2 adults emerged	2 adults emerged 11.vi.88, failed to emerge
<i>Lobesia peltophora-</i>	Aspley	Mqdn	Larva	21.vi.88	Flowers		Pupated 11.vi.88, failed to emerge 27.vi.92, pp=18 d
	Chelmer	Mqdn	Larva	2.vii.92	Flowers		Adult emerged 27.vi.92, failed to emerge
<i>completa</i>	Redbank	Mqdn	Larva	27.vi.87	Flowers		Adult emerged 27.vi.87
	Sherwood	Mqdn	2 larvae	1.vii.87		2 adults emerged	2 adults emerged
	Taronga	Mqdn	2 larvae	6.vii.87		2 adults emerged	2 adults emerged 27.vi.92, adult emerged
<i>complexa</i>	Sunnybank	Mqdn	2 larvae	1.vii.87			3 adults em. 28.vi.-1.vii.88, pp=9 d
	Tennyson	Mqdn	2 larvae	25.vi.92	Mfb flowers		Adult emerged 22.vi.92, pp=19 d
	Woodward Park	Mqdn	2 larvae	24.vi.92	Flowers		Adult emerged 22.vi.92, adult emerged
<i>Ophiorrhabda</i> sp.	Woodburn	Mqdn	Larva	5.vi.90	Leaves		Adult emerged 12 d
(Meyrick)	Burpengary	Mqdn	Larva	20.vi.89	Leaves		Adult emerged 16.vi.89, pp=23 d
	Burpengary	Mqdn	Larva	3.i.90	Tip-binder		Adult emerged 18.i.90, pp=8 d
	Chelmer	Mqdn	Larva	22.vi.92	Tip-binder		Adult emerged 20.vi.92, pp=7 d
	Coolimur	Mqdn	Larva	2.vii.92	Tip-binder		Adult emerged 24.vi.92, pp=4 d
	Emesti	Mqdn	Larva	11.vi.91	Inside gall		Adult emerged 27.vi.91, pp=8 d
	Fitzgibbon	Mqdn	Larva	25.vi.87	Tip-binder		Adult emerged 9.vii.89, pp=16 d
	Eubennanagee Swamp	Mqdn	Larva	1.vii.89	Tip-binder		Adult emerged 11.vi.87
	Fitzgibbon	Mqdn	Larva	5.vii.89	Tip-binder		Adult emerged 1.vii.89, pp=14 d
	Fitzgibbon	Mqdn	Larva	26.vii.89			Adult emerged 28.vii.89, pp=22 d

Howard River	24x.86	Mnv	Larva	24x.92	Tip-binder	Adult emerged 2.5ii.92, pp=8 d	James Cook University	17x.89	Tip-binder	Adult emerged 6.xii.89, pp=13 d	Landstortougha	17x.89	Tip-binder	Adult emerged 12.ii.92, pp=10 d	Taninga	27.13	Tip-binder	Adult emerged 27.ii.92, pp=13 d	Onoonaoba	17x.89	Tip-binder	Adult emerged 6.xii.89, pp=13 d	Landstortougha	17x.92	Tip-binder	Adult emerged 12.ii.92, pp=10 d	Tribotragan	8.jii.89	Tip-binder	Adult emerged 17.jii.91	Woodward Park	18.iii.91	Tip-binder	Adult emerged 19.x.89, pp=13 d	Emesi	18.jii.89	Tip-binder	Adult emerged 4.xii.89, pp=14 d	Fitzgibbon	26.vii.89	Tip-binder	Adult emerged 28.vii.89, pp=24 d	Rabbanak	21.v.87	Larva	21.v.87	Tip-binder	Adult emerged 7.xii.89, pp=10 d	Shewwood	22.ii.89	Larva	22.ii.89	Flowers	Adult emerged 24.x.89, pp=6 d	Slyplayton	14.x.89	Larva	14.x.89	Tip-binder	Adult emerged 27.ii.92, pp=24 d	Sunnybank	6.jv.87	Larva	6.jv.87	Flowers	Adult emerged 6.emerged 27.ji.91	Boundary Street	Mdl	Larva	20.v.92	Flowers	Adult emerged 9.vi.92	James Cook University	Mdn	Pupa	19.v.93	Flowers	Adult emerged 10.vi.92	Rockingham Road	Mvr	Larvae	12.iii.91	Flowers	5 adults emerged 27.ii.91	Willows Shopping Centre	Mdn	2 adults	17.v.92	Flowers	6 adults emerged 27.ii.91	Willows Shopping Centre	Mdn	18 larvae	18.ii.93	Flowers	18 adults emerged 21.ii.93, pp=14 d	Willows Shopping Centre	Cvm	and pupae	3.x.93	Tip-binder	Adult emerged 18.x.93
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Table 1 (cont.). Tortricidae species reared from *Melaleuca quinquenervia* and eight other myrtaceous tree species.

Species	Collection site	Host	Stage and number	Plant part	Plant part fe	collected upon	Life history information (pp=pupal period)
<i>Halocota</i> sp. C	Augus Smith Drive	Mtr	Larva 6.iij.92	Tip-binder	Adult emerged 29.iij.92, pp=20-22d		
<i>Halocota</i> sp. D	Fitzribbon	Mtr	Larva 27.vii.89	Tip-binder	Adult emerged 2.iij.89, pp=25 d		
<i>Halocota</i> sp. E	Lennox Head	Mtr	Larva 11.iij.90	Tip-binder	Adult emerged 3.x.90, pp=9 d		
<i>Burpengary</i>	Doublie Barrel Creek	Mtr	Larva 1.viii.90	Tip-binder	Adult emerged 1.x.90, pp=10 d		
<i>Brecken Ridge</i>	Nursery	Mtr	Larva 1.viii.90	Tip-binder	Adult emerged 8.x.90, pp=14 d		
<i>Felburga</i>	Euabenagge Swamp	Mtr	Larva 6.xi.93	Tip-binder	2 adults emerged 26-30.xi.93		
<i>Felburga Site 1</i>	Felburga Site 1	Mtr	Larva 23.viii.93	Tip-binder	Adult emerged 1.vi.88		
<i>Felburga Site 4</i>	Felburga Site 4	Mtr	Larva 1.viii.89	Tip-binder	Adult emerged 20.xi.93		
<i>Hubinger Road</i>	Forrest Beach Swamp	Mtr	Larva 29.iij.92	Tip-binder	2 adults emerged 18.iij.92		
<i>Indooroopilly</i>	Forrest Beach Swamp	Mtr	Larva 4.xi.93	Tip-binder	3 adults emrgered 26-28.xi.93, pp=5 d		
<i>Mumigal</i>	Forrest Beach Swamp	Mtr	Larva 4.iij.92	Tip-binder	2 adults emrgered 23.ii.93		
<i>Mumigal</i>	Forrest Beach Swamp	Mtr	Larva 23.viii.93	Tip-binder	6 adults emrgered 14.iij.93		
<i>Nathan Plaza</i>	Forrest Beach Swamp	Mtr	Larva 12.x.93	Tip-binder	Adult Q emerged 27.x.93, pp=9 d		
<i>Omooomba</i>	Forrest Beach Swamp	Mtr	Larva 27.iij.93	Tip-binder	Adult Q emerged 16.iij.93		

Table 1 (cont.). Tortricidae species reared from *Melaleuca quinquenervia* and eight other myrtaceous tree species.

Species	Collection site	Host Plant	Stage and number collected	Date collected	Plant part fe upon	Life history information (pp=pupal period)
<i>Strepsicrates cf. transfixa</i> (Turner) ¹¹	Pottsville	Mqn	Larva	17.viii.88	Tip-binder	Adult emerged
	Rowes Bay Golf Club	Mlb	Larva	21.vii.86		Adult emerged
	Willows Shopping Centre	Mqn	Larva	3.viii.93	Tip-binder	Adult ♀ em. 20.viii.93, pp=11 d
	Woodward Park	Mqn	2 larvae	29.vii.88	Tip-binder	2 adults emerged 28.viii.88
	Woodward Park	Mqn	1 ³	7.viii.89	Fruit	
	Woodward Park	Mqn	Larva	9.vii.90		Adult emerged
	Woodward Park	Mqn	2 pupae	3.ix.92		Adult emerged
	Feluga Site 1	Mqn	Larva	11.vii.88		2 adult ♀ emerged 17-18.ix.92
	Caloundra	Mqn	Larva	18.vii.89	Tip-binder	Adult emerged 31.vii.88
	Ernest	Mqn	Larva	4.x.89	Tip-binder	Adult ♀ emerged 26.viii.89, pp=21 d
<i>Isotenes miserana</i>	James Cook University	Mqn	Larva	1.vii.93	Tip-binder	Adult ♂ emerged
	James Cook University	Cvm	Larva	29.xi.93	Tip-binder	Adult ♂ emerged 11.xii.93
<i>Dudua aprobola</i>	Pallarenda	Mlb	Larva	16.vi.93	Tip-galls ¹²	Adult emerged 6.vii.93

¹ Mqn = *M. quinquenervia*, Mcj = *M. cajuputi*, Mdl = *M. dealbata*, Mlb = *M. leucadendra*, Mnv = *M. nervosa*, Mvr = *M. viridiiflora*, Cvm = *Callistemon viminalis*, Ets = *Eucalyptus ?tessellaris*, Lsv = *Lophostemon suaveolens*.

² Probably an undescribed species.

³ A notorious pest with over 250 host plants in New Zealand alone (Suckling *et al.* 1990), plus others listed in Common (1990) and Swaine *et al.* (1991).

⁴ *Isotenes miserana* feeds on the leaves of many trees and also on the fruit of economic crops (Common 1990).

⁵ Larvae fed and pupated within a "fleshy-tip" gall formed by *Fergusonina* sp. (Diptera: Fergusoninidae).

⁶ Probably an undescribed species. Looks similar to *I. miserana* but ♀ has a dark grey anal tuft.

⁷ *Dudua aprobola* is a polyphagous minor orchard pest in the oriental-Australian region (Van der Geest and Evenhuis 1991) and has also been recorded from the introduced *Mimosa pigra* (Mimosaceae) in the Northern Territory (Wilson *et al.* 1990).

⁸ *M. quinquenervia* flowers unavailable.

⁹ Larva collected within "puff-ball" gall.

¹⁰ *Holocola thalassinana* also feeds upon *Leptospermum laevigatum* (Meyrick 1882, 1911; McQuillan 1992).

¹¹ All *Strepsicrates* identifications are tentative as the genus needs revision and species can only be reliably identified by dissection.

¹² Larvae bored through tip-galls.

¹³ Adult emerged from woody fruit. May have been collected as a larva or pupa.

the most appropriate currently available, but generic assignments are tentative only. The staff at the U.S. Dept. of Agriculture's Australian Biological Control Laboratory (ABCL) associated the larvae with the identified adults. A representative series of specimens will be held at the ABCL, while the majority of specimens will be deposited at the Australian National Insect Collection (ANIC) in Canberra.

The Tortricidae were collected and reared on *M. quinquenervia* or one of five of its close relatives in the *M. leucadendra* complex: *M. leucadendra*, *M. dealbata* S.T. Blake, *M. viridiflora* Sol. ex Gaertn., *M. nervosa* (Lindl.) Cheel, and *M. cajuputi* Powell. Records for specimens of several of the same tortricid species collected on *Callistemon viminalis* (Sol. ex Gaertn.) G. Don ex Loudon, *Eucalyptus tessellaris* F. Muell. and *Lophostemon suaveolens* (Sol. ex Gaertn.) Peter G. Wilson & J.T. Waterhouse (all Myrtaceae) also are presented.

Our collecting was concentrated in two main regions of the Australian east coast. In northern Queensland (NQ), our regularly sampled sites ranged from the Daintree River, north of Cairns, to Townsville. Our second major collecting region was from Coolum in southeastern Queensland (SQ) to Grafton in northern New South Wales (NSW). Most of the site locations in this paper have been listed in the three previous papers in this series (Balciunas *et al.* 1993a, 1993b, Burrows *et al.* 1994). The NQ sites listed here for the first time are: **Alva Beach** (19°27.5'S 147°28.9'E), 15 km NE of Ayr; **Eclipse Street*** (19°14.4'S 146°47.2'E), Townsville; **Rowes Bay Golf Club*** (19°13.8'S 146°46.5'E), Townsville; and **Willows Shopping Centre*** (19°19.1'S 146°43.5'E), Townsville. The SQ sites listed here for the first time are: **Ernest** (27°55.5'S 153°23.2'E), 62 km SE of Brisbane GPO; **Landsborough** (26°48.2'S 152°58.9'E), Brisbane; **Redbank*** (27°36.1'S 152°52.9'E), 21 km SW of Brisbane GPO; **Tennyson*** (27°31.5'S 152°59.4'E), 7 km SSW of Brisbane GPO; and **Woodford** (26°55.6'S 152°46.1'E), 68 km NW of Brisbane GPO. We also present records from NSW at **Maclean** (29°26.9'S 153°13.7'E), 145 km S of Coolangatta GPO and the Northern Territory at **Howard River** (12°27.7'S 131°04.9'E), 31 km W of Darwin. Sites marked with an asterix (*) are either ornamental plantings or forest remnants in urban areas.

Results

Our collection and rearing records for Tortricidae are presented in Table 1.

Discussion

There are assumed to be about 1230 species of Tortricidae in Australia (Nielsen and Common 1991), half of which are named. The majority of Australian tortricids are believed to have coevolved with the Australian plant communities, most notably with eucalypts and other Myrtaceae (Common 1980). Common (1980) reported that out of 199 reared species, 53 were from

Eucalyptus spp. Two separate groups within the Tortricidae concentrate on myrtaceous host plants, the tribe Epitymbiini in the Tortricinae and several genera of the tribe Eucosmini in the Olethreutinae. The Epitymbiini largely feed on dead leaves, including the 40 species reared from dead eucalypt leaves (Common 1980). A majority of the few species reared in the genera *Strepsicrates* Meyrick, *Holocola* Meyrick, *Bathrotoma* Meyrick and related eucosmine genera have myrtaceous host plants (ANIC rearing records, McQuillan 1992). For the present study, we reared some 21 tortricid taxa from a few *Melaleuca* species, without sampling dead leaves. Half of these belong to the Eucosmini, often to closely related species or species complexes, emphasising the group's strong relationship with myrtaceous host plants.

Host records for 21 reared taxa are presented in this paper. Three of the Tortricidae collected are known polyphages: *Dudua aprobola*, *Epiphyas postvittana* and *Isotenes* cf. *miserana*. The only published records of Tortricidae from *Melaleuca* that we could find are from Common (1990), who indicated that *Bathrotoma constrictana* Meyrick and *E. postvittana* had been reared from unspecified species of *Melaleuca*. Thus the host records presented here are apparently all new and, for 17 of these taxa, appear to be the first published.

Although several other *Strepsicrates* species are known to cause damage to eucalypts in nurseries and plantations (Van der Geest and Evenhuis 1991), this only highlights their potential usefulness in retarding plant growth. The three *Strepsicrates* species we collected are reasonably common and could be promising potential biological control agents, if any prove to be sufficiently host-specific. Worldwide, nine tortricid species have been released as biological control agents for weeds (Julien 1992), including one *Strepsicrates* species. The larvae of the three *Strepsicrates* species we collected bind young tips, or feed on the flowers, of *M. quinquenervia*. Their feeding activities damage new tips, thus restricting branch growth. Young *M. quinquenervia* tips are most prevalent from July to November, when the flush of young growth appears following the end of the winter flowering period. Identifying the adults of these species is frequently difficult and distinguishing the larvae, especially while they are alive, has usually not been possible. This will be a significant impediment to developing these species as biological control agents. "*Bathrotoma*" *quietana* and *Holocola* sp. B are also damaging, but less common and might be considered as biocontrol agents if sufficient numbers can be collected to determine their host range.

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